

NON-PUBLIC?: N  
ACCESSION #: 9201150149  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Nine Mile Point Unit 2 PAGE: 1 OF 04

DOCKET NUMBER: 05000410

TITLE: Reactor Scram Caused By A Turbine Control System Malfunction  
EVENT DATE: 12/07/91 LER #: 91-022-00 REPORT DATE: 01/06/92

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 090

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: John T. Conway, Manager TELEPHONE: (315) 349-2698  
Technical Support NMP2

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

#### ABSTRACT:

On December 7, 1991, at 0935 hours, with the reactor mode switch in the "RUN" position (Mode 1), and the plant operating at approximately 90 percent rated thermal power (905 MWE), Nine Mile Point Unit 2 experienced an Engineered Safety Feature actuation. Specifically, an automatic reactor scram occurred caused by a Turbine Generator stop valve closure, which was initiated by (most probable cause) an Electrohydraulic Control (EHC) System malfunction.

The root cause investigation is still underway and has not yet determined the exact cause; however, the most probable cause is a defective relay actuation.

The immediate corrective action was to respond to the reactor scram and turbine trip in accordance with plant procedures. A Work Request was issued to investigate the EHC malfunction, which led to the replacement

of the relay board containing the suspected faulty relay.

END OF ABSTRACT

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## I. DESCRIPTION OF EVENT

On December 7, 1991, at 0935 hours, with the reactor mode switch in the "RUN" position (Mode 1), and the plant operating at approximately 90 percent rated thermal power (905 MWE), Nine Mile Point Unit 2 experienced an Engineered Safety Feature actuation. Specifically, an automatic reactor scram occurred caused by a Turbine Generator stop valve closure, which was initiated by (most probable cause) an Electrohydraulic Control (EHC) System malfunction.

At 09:34:54 hours the Turbine stop valves closed, the combined intermediate valves closed and the Turbine bypass valves opened. These events were recorded to have initiated during the same second. When the Turbine stop valves reached the 95 percent open position the reactor protection circuitry anticipated the Turbine trip transient and automatically scrambled the reactor. The Turbine tripped approximately six seconds later due to the Main Generator anti-motoring protection which subsequently tripped the Turbine control valves shut.

At the time of the event, Operations Surveillance Procedure N2-OSP-RPS-W001, "Weekly Turbine Valve Cycling," was in progress. One of the prerequisites to performance of this test was to lower reactor pressure to 980 pounds per square inch gauge (psig). Reactor power had already been lowered to approximately 90% of rated and reactor pressure was being reduced by lowering the EHC pressure setpoint. A reactor pressure adjustment had been completed and the operators were observing plant response when the event occurred. All 5 Turbine bypass valves opened and controlled reactor pressure. The Emergency Operating Procedures (EOPs) were entered on low reactor vessel water level when level decreased to Level 3 (159.3 inches). The cause of the lowering reactor vessel water level was shrink caused by the rapid downpower and is an expected plant response following a reactor scram from high power. Feedwater level control maintained water level between 148.5 inches and 192 inches. Reactor pressure was maintained between 1029 and 864 PSI without any safety relief valves lifting.

There were no inoperable systems which contributed to this event. No plant system or component failures resulted from this event.

## II. CAUSE OF EVENT

The most probable immediate cause of the event was a malfunction of the Turbine EHC System. The result of the postulated malfunction was a sudden "ALL VALVES CLOSED" signal.

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## II. CAUSE OF EVENT (cont.)

A root cause analysis is being performed using Nuclear Division Procedure NDP-16.01, "Root Cause Evaluation." The results of the investigation and troubleshooting efforts to date indicate that the most probable cause of the event was a malfunctioning mercury wetted relay (K6D27) in the speed select circuit of the Turbine EHC System.

The EHC first hit lights indicated that the combined intermediate valves fast closed first. Two signals, other than a turbine trip, will cause the intermediate valves to fast close, and also cause the stop valves to close. One is an "ALL VALVES CLOSED" signal, which causes all Turbine Generator stop, control, and combined intermediate valves to close. The other is the "Power Load Unbalance" circuitry, which shuts the Turbine Generator combined intermediate valves to slow an overspeeding turbine or trips all valves closed on an imbalance between load on the turbine and the generator. All components in the logic for both these circuits, which alone could have caused this malfunction, were tested and no failures or malfunctions were observed. The EHC system response to the event could only be duplicated by simulating an "ALL VALVES CLOSED" signal. This led to the replacement of the board containing mercury wetted relay, K6D27, which was determined to be the most probable faulty component.

The relay board that was replaced is being sent out for destructive failure analysis to determine if the relay malfunctioned. This analysis may not be conclusive; however, if the postulated root cause is confirmed, a supplement to this report will be submitted.

## III. ANALYSIS OF EVENT

This event is reportable in accordance with 10CFR50.73 (a)(2)(iv), "Any event or condition that results in manual or automatic actuation of any Engineered Safety Feature (ESF) including the Reactor Protection System (RPS)."

There were no safety consequences to the public or plant as a result of this event. This event is bounded by the spectrum of events discussed in the Updated Safety Analysis Report in section 15.2.3, "Turbine Trip."

#### IV. CORRECTIVE ACTION

The immediate corrective action was for the operators to implement immediate actions for scram response per Operating Procedure N2-OP-101C, "Plant Shutdown."

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#### IV. CORRECTIVE ACTION (cont.)

Additional corrective actions include:

- 1) A Work Request (WR #196666) was issued for troubleshooting the EHC System, which led to the replacement of relay K6D27.
- 2) Further evaluation by the EHC System task force, that evaluates and provides corrective actions for EHC System malfunctions, is planned.
- 3) Further corrective actions will be evaluated pending the outcome of the relay board failure analysis.

#### V. ADDITIONAL INFORMATION

##### A. Previous similar events:

Only two previous similar events have occurred. They are detailed in LER 89-014, "Nine Mile Point Unit 2 Reactor Scram Due To Turbine Trip Caused By Loose Wire Connections," and LER 89-040, "Reactor Scram On High Neutron Flux Due To Electrohydraulic Control System Malfunction." Neither of the failed components in the events described above could have caused this event to occur because different circuits within the EHC trip logic were affected. Therefore, the corrective actions from these two previous events would not have prevented this event from occurring.

##### B. Identification of components referred to in this LER.

Table omitted.

##### C. Failed components: under investigation.

ATTACHMENT 1 TO 9201150149 PAGE 1 OF 1

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Joseph F. Firlit  
Vice President  
Nuclear Generation NMP83187

January 6, 1992

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

RE: Docket No. 50-410  
LER 91-22

Gentlemen:

In accordance with 10CFR50.73, we hereby submit the following Licensee  
Event Report:

LER 91-22 Is being submitted in accordance with 10CFR50.73  
(a)(2)(iv), "Any event or condition that resulted in  
manual or automatic actuation of any Engineered Safety  
Feature (ESF), including the Reactor Protection System  
(RPS)."

This  
report was completed in the format designated in NUREG-1022,  
Supplement 2, dated September 1985.

Very truly yours,

Joseph F. Firlit  
Vice President - Nuclear Generation

JFF/RM/lmc

ATTACHMENT

xc: Thomas T. Martin, Regional Administrator Region I  
Wayne L. Schmidt, Sr. Resident Inspector

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